

REMARKS

Applicants respectfully request reconsideration and further examination of the present application.

I. Status of the Claims

With this Amendment B, claims 40, 51, 52 and 61 have been amended to more particularly claim certain embodiments of the present invention. Support for the amendment to claim 40 may be found in the present application on, for example, page 31, lines 24-27 (wherein it is stated that the solvent moiety may be covalently bound to the polymer backbone, or a side chain or substituent thereon) and page 34, lines 14-16 (where it is stated that the solvent moiety can be attached to the cross-linker). Support for the amendment to claim 51 may be found, for example, in claims 5 and 8, as originally filed. Support for the amendment to claim 52 may be found in the present application on, for example, page 20, lines 8-19 and in Example 2 (see B.1, 2 and 3 on pages 59 and 60). Support for the amendment to claim 61 may be found within claim 61 as originally filed, as well as in the present application on, for example, page 41, line 24 to page 42, line 14, and page 42, line 27 to page 43, line 5.

Accordingly, claims 1-77 remain pending and under consideration.

II. Rejections under 35 U.S.C. §112, Second Paragraph

Reconsideration is respectfully requested of the rejection of claims 40-52 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

A. Claims 49-52

In the interest of expediting allowance of the present application, Applicants have amended claims 51 and 52 to more particularly claim a certain preferred polymer and cross-linker composition, respectively. Given that these claims no longer specifically call for a protic solvent, Applicants respectfully submit that the present rejection is rendered moot. Withdrawal of the present rejection of claims 49-52 is therefore requested.

With respect to the present rejection, however, it is to be noted that Applicants respectfully reiterate the comments provided in their Letter to the Patent Office of March 3, 2005. It is to be further noted that Applicants hereby reserve the right to pursue claims 51 and 52 as originally filed in a future continuing application.

B. Claims 40-48

In the interest of expediting allowance of the present application, Applicants have amended claim 40, from which claims 41-48 depend, to state that one or more solvent moieties present therein are covalently bound to (i) said polymer backbone, (ii) a substituent or side chain of said polymer backbone, or (iii) said cross-linker.

As noted above, the amendment to claim 40 finds support in the application on, for example, page 31, lines 24-27, wherein it is stated:

The solvent moiety may be included in the polymer **by tethering (i.e., covalently bonding) the moiety to the finished polymer (backbone, side chain or substituent) . . .**
(Emphasis added)

The amendment to claim 40 finds further support in the application on, for example, page 34, lines 14-16, wherein it is stated:

Alternatively, the **solvent moiety could**, for example, **be built into the cross-linker**, such that cross-linking and introduction of the solvent moiety occurs at the same time by the use of a single compound. (Emphasis added)

Applicants respectfully submit, contrary to the Office's assertion that the application only discloses the solvent moiety being bound to the polymer backbone (see page 2 of the present Office action), the first passage noted above indicates that the solvent moiety may be tethered, **that is, covalently bound**, to the polymer backbone, a side chain on the polymer backbone, or a substituent on the polymer backbone.¹ The second passage noted above further indicates that the solvent moiety may be bound to the cross-linker, the solvent moiety for example being made part of the cross-linker prior to a cross-linking reaction.

Given that claim 40 has been amended to recite what the solvent moiety may be bound to, consistent with the above-noted text of the present application, Applicants respectfully request withdrawal of this rejection of claims 40-48.

III. Rejections under 35 U.S.C. §102(b)

Reconsideration of the rejection of claims 1, 2, 5-11, 30, 32, 34, 49 and 53-73 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,789,106 (Rosenmeier et al.) is once again respectfully requested, in as much as Applicants submit that each and every element as set forth in the rejected claims is not described in this patent, as further detailed below.

In the interests of brevity, Applicants will not restate all of the comments previously submitted in their Letter to the Patent Office of March 3, 2005. Applicants do, however, maintain all of those comments with respect to the present rejection.

¹ It is to be noted that the abbreviation "i.e." is well understood to mean "that is".

A. *Claims 1, 2, 5-11, 30, 32, 34 and 57-60*

Claim 1, from which claims 2, 5-11, 30, 32 and 34 depend, is directed to a covalently cross-linked polymer electrolyte. The polymer electrolyte comprises a polymer backbone containing amine groups, a cross-linker, and a dissolved or dispersed metal salt, wherein the cross-linked polymer electrolyte is **inert to lithium**.

Claim 57, from which claims 58-60 depend, is directed to a battery which, in relevant part, comprises a covalently cross-linked polymer electrolyte having a polymer backbone containing amine groups, a cross-linker, and a dissolved or dispersed metal salt, wherein the cross-linked polymer electrolyte is **inert to lithium**.

As to the disclosure of Rosenmeier et al., the Office states (i) that the polymer materials of Rosenmeier are exemplary of the same materials used and claimed in the instant application, and therefore (ii) that one of ordinary skill in the art would have reasonably expected the prior art polymer backbone to have the same properties as that of the instant application and thus be inert to lithium (see the Office action at page 6). Applicants respectfully disagree.

Applicants submit Rosenmeier et al. do not inherently disclose a cross-linked polymer having amine groups in the polymer backbone. Applicants note that, (i) at column 5, lines 43-65, Rosenmeier et al. provide a long list of exemplary types of polymers, including a type of polymer which has amine groups in the backbone, and (ii) at lines 66-67 of this same column they indicate these polymers **may or may not** be cross-linked. However, there is **no other reference** in this patent to polymers having amine groups in the backbone.² Furthermore, there is **no specific reference to any**

² Contrary to the Office's assertion on page 7, fourth full paragraph, of the present Office action regarding what the Abstract of this patent discloses, it is to be noted that column 2, line 5 to column 3, line 22, and particularly column 3, lines 21-22, of this patent clearly indicates the NR^5R^6 group is attached to a substituent of the polymer backbone, and thus is **not** part of the polymer backbone.

type of cross-linker, or to any type of cross-linked polymer having amine groups in the backbone, and therefore there is also **no reference** to such a cross-linked polymer which is inert to lithium.

In view of the foregoing, Applicants respectfully submit that the disclosure provided by Rosenmeier et al. is **not a sufficient basis** upon which to argue a cross-linked polymer having amine groups in the backbone is inherently disclosed therein because, in order to arrive at a polymer having the same compositional constituents as recited in these claims as the Office has asserted (see page 7, first full paragraph of the present Office action), one would have to **select** cross-linking, and furthermore **select** from the long list of polymers the **only** type of polymer, polyalkyleneimines, which actually has amine groups in the polymer backbone.

Furthermore, even assuming *arguendo* that the limited disclosure provided by Rosenmeier et al. is a sufficient basis upon which to conclude that a cross-linked polyalkyleneimine has been inherently disclosed, as Applicants have already pointed out, **not all cross-linked polymers** having amine groups in the polymer backbone, and thus not all cross-linked polyalkyleneimines, **are inert to lithium** (see, e.g., page 19, lines 9-13 of the present application, as well as page 5, first full paragraph of Applicants' Letter to the Patent Office of March 3, 2005).³

As Applicants have previously noted, the mere fact that a certain result or characteristic **may** occur or be present is not sufficient to establish the inherency of that result or characteristic (see MPEP §2112). It is therefore respectfully submitted that claims 1 and 57 are novel over Rosenmeier et al., because Rosenmeier et al. **fail to**

³ Applicants respectfully submit the noted statements in the present application are directly and sufficiently responsive to the Office's statement on page 7, first full paragraph, of the present action that Applicants are required "to provide that that [sic] the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product."

disclose each and every element recited in claim 1 or claim 57. Accordingly, reconsideration of this rejection is requested.

In as much as claims 2, 5-11, 30, 32 and 34 depend from claim 1, and claims 58-60 depend from claim 57, these claims are submitted as novel over Rosenmeier et al. for at least the same reasons as those noted for claims 1 and 57, respectively. Although these claims include additional novel features, these features will not be addressed at this time in the interest of brevity.

B. Claims 49 and 53-56

Claim 49 is directed to a covalently cross-linked polymer electrolyte which comprises a polymer backbone containing amine groups, a cross-linker, and labile protons therein **in the absence of a protic solvent**.

Claim 53, from which claims 54-56 depend, is directed to a fuel cell which, in relevant part, comprises a proton-conducting, covalently cross-linked polymer electrolyte having a polymer backbone containing amine groups, a cross-linker, and labile protons therein **in the absence of a protic solvent**.

In response to the Office's position on page 8, first full paragraph, of the present Office action that the Abstract of the Rosenmeier et al. patent discloses a polymer having amine groups in the backbone, it is to be noted that column 2, line 5 to column 3, line 22, and particularly column 3, lines 21-22, of this patent clearly indicates the NR^5R^6 group is attached to a substituent of the polymer backbone, and thus is **not** part of the polymer backbone.

In response to the Office position that (i) that the polymer materials of Rosenmeier are exemplary of the same materials used and claimed in the instant application, and therefore (ii) that one of ordinary skill in the art would have reasonably expected the prior art polymer backbone to have the same properties as that of the

instant application (see the Office action at page 8, second and third paragraphs), Applicants respectfully restate their position as set forth above; that is, Applicants respectfully submit Rosenmeier et al. do not inherently disclose a cross-linked polymer having amine groups in the polymer backbone for the same reasons as set forth above.⁴ Applicants further submit there is **no reference** to any type of cross-linker, or to any type of cross-linked polymer having amine groups in the backbone, and therefore there is also **no reference** to such a cross-linked polymer which contains labile protons **in the absence of a protic solvent**.⁵

In view of the foregoing, Applicants respectfully submit that the disclosure provided by Rosenmeier et al. is **not a sufficient basis** upon which to argue a cross-linked polymer having amine groups in the backbone is inherently disclosed therein because, in order to arrive at a polymer having the same compositional constituents as recited in these claims, one would have to **select** cross-linking, and furthermore **select** from the long list of polymers the **only** type of polymer, polyalkyleneimines, which actually has amine groups in the polymer backbone.

Furthermore, even assuming *arguendo* that the limited disclosure provided by Rosenmeier et al. is a sufficient basis upon which to conclude that a cross-linked polyalkyleneimine has been inherently disclosed, as Applicants have already pointed out, **not all cross-linked polymers** having amine groups in the polymer backbone, and thus not all cross-linked polyalkyleneimines, **contain labile protons in the absence of a protic solvent** (see, e.g., page 35, lines 3-12 of the present application, as well as

⁴ Applicants note that the Office references being inert to lithium in this portion of the rejection. In as much as the claims at issue here do not include such a limitation, it is assumed for purposes of this Amendment B that this is a typographical error and that the intent here was to refer to the presence of labile protons.

⁵ Applicants respectfully submit that Ronsenmeier et al. make no reference to a cross-linked polymer electrolyte having amine groups in the polymer backbone and containing labile protons in the absence of a protic solvent at column 9, lines 29-48, which the Office appears to assert on page 4, last full paragraph, of the present action, or anywhere else in the text of this patent.

page 6, third full paragraph of Applicants' Letter to the Patent Office of March 3, 2005).⁶ Stated another way, even if amine groups are present in the polymer backbone, such as in the case of polyethylenimine, these do not inherently form labile protons.

As Applicants have previously noted, the mere fact that a certain result or characteristic **may** occur or be present is not sufficient to establish the inherency of that result or characteristic (see MPEP §2112). It is therefore respectfully submitted that claims 49 and 53 are novel over Rosenmeier et al., because Rosenmeier et al. **fail to disclose each and every element** recited in these claims. Accordingly, reconsideration of this rejection is requested.⁷

In as much as claims 54-56 depend from claim 53, these claims are submitted as novel over Rosenmeier et al. for at least the same reasons as those noted for claim 53. Although these claims include additional novel features, these features will not be addressed at this time in the interest of brevity.

C. Claims 61-65

Claim 61, from which claims 62-65 depend, is directed to a gradient battery. This battery comprises metal ions, a negative electrode, a positive electrode and an electrolyte disposed between the negative and positive electrodes. **Each of the electrodes**, as well as the electrolyte, **comprise a cross-linked poly(amine)**.

⁶ Applicants respectfully submit the noted statements in the present application are directly and sufficiently responsive to the Office's statement on page 9, first full paragraph, of the present Office action that Applicants are required "to provide that that [sic] the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product."

⁷ In response to the Office's statements on page 9, last two full paragraphs (the latter of which appears not to be complete), which relate to the protic solvent limitation, please note that Applicants have not addresses these statements because it is their belief that the amendments made to claims 51 and 52 in this Amendment B render this issue moot.

Furthermore, **each of the electrodes**, as well as the electrolyte, is a **region within a continuous, covalently cross-linked poly(amine) film**.

With respect to the Office's position that Rosenmeier et al. teach the same polymer electrolyte as the claimed, Applicants respectfully restate their position as set forth above; that is, Applicants respectfully submit Rosenmeier et al. do not inherently disclose a cross-linked polymer having amine groups in the polymer backbone for the same reasons as set forth above. Accordingly, Applicants further submit Rosenmeier et al. do not inherently disclose a battery comprising such a polymer.

However, assuming *arguendo* that the limited disclosure provided by Rosenmeier et al. is a sufficient basis upon which to conclude that a cross-linked polyalkyleneimine has been inherently disclosed, as Applicants have previously pointed out (see Applicants' Letter to the Patent Office of March 3, 2005 at page 7, third full paragraph), claim 61 is directed to a battery wherein the negative electrode, the positive electrode and the electrolyte are all part of a continuous, covalently cross-linked polymer film. Stated another way, not only do **the negative and positive electrodes** of the claimed battery, in addition to the electrolyte, **comprise a cross-linked poly(amine) film**, the negative electrode, the positive electrode and the electrolyte are regions within a continuous, covalently cross-linked poly(amine) film.

In contrast to the battery of claim 61, a conventional battery, such as the one disclosed by Rosenmeier et al. (at column 9, lines 49-64) is made up of layers having different compositions which are laminated together, thus differing from the claimed battery in many respects. For example, Rosenmeier et al. describe a battery wherein the anode is said to consist of a sheet of nickel foil, which serves as the current collector, laminated with a sheet of foil of an alkali metal. The electrolyte is then laminated to this anode. A cathode is then laminated to the electrolyte of the side opposite the anode, the cathode simply said to comprise an intercalating material.

Notably, the electrolyte, the anode and the cathode disclosed by Rosenmeier et al. **are not** part of a continuous, covalently cross-linked poly(amine) film. In addition, the anode itself **does not** comprise a cross-linked poly(amine) film. Finally, Rosenmeier et al. make **no reference** to a cathode which comprises a cross-linked poly(amine) film.

In view of the foregoing, claim 61 is submitted as novel over Rosenmeier et al., because they **fail to disclose each and every element** recited therein. In as much as claims 62-65 depend from claim 61, these claims are submitted as novel over Rosenmeier et al. for at least the same reasons as those noted for claim 61. Although these claims include additional novel features, these features will not be addressed at this time in the interest of brevity.

D. Claims 66-73

Claim 66, from which claims 67-69 depend, is directed to a covalently cross-linked polymer single ion electrolyte. The polymer electrolyte comprises a polymer backbone containing amine groups, a cross-linker, and an ion pair, **one member** of the ion pair being **covalently attached** to the polymer backbone and **the other** being **capable of diffusing** through the polymer electrolyte upon the application of an electric field.

Claim 70, from which claims 71-73 depend, is directed to an electrolytic cell which, in relevant part, comprises a covalently cross-linked polymer single ion electrolyte having a polymer backbone containing amine groups, a cross-linker, and an ion pair, **one member** of the ion pair being **covalently attached** to the polymer backbone and **the other** being **capable of diffusing** through the polymer electrolyte upon the application of an electric field.

Applicants respectfully restate their position as set forth above; that is, Applicants respectfully submit Rosenmeier et al. do not inherently disclose a cross-linked polymer

having amine groups in the polymer backbone for the same reasons as set forth above. Applicants further submit there is **no specific reference** to any type of cross-linker, or to any type of cross-linked polymer having amine groups in the backbone, and therefore there is also **no reference** to such a cross-linked polymer which contains an ion pair, wherein one member of the ion pair is covalently attached to the polymer backbone and the other is capable of diffusing through the polymer electrolyte upon the application of an electric field.

In view of the foregoing, Applicants respectfully submit that the disclosure provided by Rosenmeier et al. is **not a sufficient basis** upon which to argue a cross-linked polymer having amine groups in the backbone is inherently disclosed therein because, in order to arrive at a polymer having the same compositional constituents as recited in these claims, one would have to **select** cross-linking, and furthermore **select** from the long list of polymers the **only** type of polymer, polyalkyleneimines, which actually has amine groups in the polymer backbone.

In response to the Office's position on page 10, last full paragraph, of the present Office action that the Abstract of the Rosenmeier et al. patent discloses a polymer having amine groups in the backbone, it is to be noted that column 2, line 5 to column 3, line 22, and particularly column 3, lines 21-22, of this patent clearly indicates the NR^5R^6 group is attached to a substituent of the polymer backbone, and thus is **not** part of the polymer backbone.

Furthermore, even assuming *arguendo* that the limited disclosure provided by Rosenmeier et al. is a sufficient basis upon which to conclude that a cross-linked polyalkyleneimine has been inherently disclosed, **not all cross-linked polymers** having amine groups in the polymer backbone, and thus not all cross-linked polyalkyleneimines, contain an ion pair wherein **one member** of the ion pair is **covalently attached** to the polymer backbone and **the other** is **capable of diffusing** through the polymer electrolyte upon the application of an electric field.

As Applicants have previously noted, the mere fact that a certain result or characteristic **may** occur or be present is not sufficient to establish the inherency of that result or characteristic (see MPEP §2112). It is therefore respectfully submitted that claims 66 and 70 are novel over Rosenmeier et al., because Rosenmeier et al. **fail to disclose each and every element** recited in these claims. Accordingly, reconsideration of this rejection is requested.

In as much as claims 67-69 depend from claim 66, and claims 71-73 depend from claim 70, these claims are submitted as novel over Rosenmeier et al. for at least the same reasons as those noted for claims 66 and 70, respectively. Although these claims include additional novel features, these features will not be addressed at this time in the interest of brevity.

IV. Rejections under 35 U.S.C. §103

Reconsideration of the present rejections under 35 U.S.C. §103 is also respectfully requested.

In the interests of brevity, Applicants will not restate all of the comments previously submitted in their Letter to the Patent Office of March 3, 2005. Applicants do, however, maintain all of those comments with respect to the present rejection.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. And third, the prior art reference must teach or suggest all of the claim elements. MPEP §2142. In the instant case, Applicants respectfully submit, for the reasons set forth in detail below, that the claimed inventions are not obvious in view of the cited references because these references, both alone and in combination, **fail to disclose or suggest all of the**

claim elements. Additionally, in at least some instances, motivation to combined the cited references is lacking.

*A. Rejection of Claims 3 and 4 as being Unpatentable
over Rosenmeier et al. in view of JP 06-329793*

Reconsideration is respectfully requested of the rejection of claims 3 and 4 under 35 U.S.C. §103 as being unpatentable over Rosenmeier et al. in view of Japanese Patent Publication No. JP 06-329793 (hereinafter "JP '793").

Claim 1, from which claims 3 and 4 depend, is directed to a covalently cross-linked polymer electrolyte. The polymer electrolyte comprises a polymer backbone containing amine groups, a cross-linker, and a dissolved or dispersed metal salt, wherein the cross-linked polymer electrolyte is **inert to lithium**.

In the interests of brevity, Applicants respectfully refer the Office to the comments Applicants provided above under III., A., in support of their position that Rosenmeier et al. do not inherently disclose or suggest a cross-linked polymer having amine groups in the polymer backbone. Applicants further refer the Office to the comments they provided above under III., A. in support of their position that, even assuming *arguendo* that Rosenmeier et al. do inherently disclose a cross-linked polymer having amine groups in the polymer backbone, **not all cross-linked polymers** having amine groups in the polymer backbone, and thus not all cross-linked polyalkyleneimines, **are inert to lithium**.

The reference JP '793 does not remedy the above-noted deficiencies of the disclosure of Ronsenmeier et al. JP '793 **fails to disclose or suggest** a covalently cross-linked polymer electrolyte having a polymer backbone containing amine groups, a cross-linker, and a dissolved or dispersed metal salt, wherein the cross-linked polymer electrolyte is **inert to lithium**. In fact, JP '793 arguably **teaches away** from such a cross-linked polymer electrolyte because (i) it discloses the use of diisocyanate cross-

linking agents (see, e.g., the Abstract, paragraph [0007] and Formula 1, wherein it is indicated that each "X" of the cross-linking agent is an isocyanate group), and (ii) cross-linking using diisocyanates is known to result in the formation of urethane linkages or functionalities, which are **not** inert to lithium.⁸

Accordingly, taken together, Applicants respectfully submit Rosenmeier et al. and JP '793 clearly fail to disclose or suggest all of the claim elements of claim 1, and thus of claims 3 and 4, in as much as these references collectively fail to disclose or suggest a cross-linked polymer electrolyte which comprises amines in the polymer backbone and which is **inert to lithium**. Rather, taken together, this combination of references actually **teaches away** from the claimed polymer electrolyte because, at most, this combination teaches a cross-linked polymer electrolyte which comprises amine groups in the polymer backbone and which is **not** inert to lithium.

Claim 1 is therefore submitted as patentable over the cited references. In as much as claims 3 and 4 depend from claim 1, these claims are submitted as patentable over the cited references for at least the same reasons as those noted with respect to claim 1. Although these claims include additional patentable features, these features will not be addressed at this time in the interests of brevity.

B. Rejection of Claims 19-22 and 25 as being Unpatentable over Rosenmeier et al. in view of U.S. Patent No. 5,501,919

Reconsideration is respectfully requested of the rejection of claims 19-22 and 25 under 35 U.S.C. §103 as being unpatentable over Rosenmeier et al. in view of U.S. Patent No. 5,501,919 (Paul et al.).

⁸ As Applicants previously pointed out on page 10, last full paragraph, of their Letter to the Patent Office dated March 3, 2005, urethane linkages or functionalities are known to be reducible by lithium and thus are not inert thereto.

Applicants' position with respect to the failures in the disclosure provided by Rosenmeier et al. have been previously noted. In the interests of brevity, they will not be restated here.

Contrary to the Office assertion (see page 13, fifth full paragraph), Applicants respectfully submit Paul et al. **fail to disclose or suggest** a polymer electrolyte that is covalently **cross-linked**. In fact, Applicants submit Paul et al. make **no reference** to cross-linking. Applicants further submit Paul et al. **fail to disclose or suggest** a covalently cross-linked electrolyte which is inert to lithium. Rather, Paul et al. simply disclose the preparation of branched polyethylenimine which has a lithium salt therein (see the Abstract, which the Office referenced), and one of ordinary skill in the art would recognize **branching is not the same as cross-linking**.

Accordingly, taken together, Rosenmeier et al. and Paul et al. fail to disclose or suggest all of the claim elements of claim 1, and thus of claims 19-22 and 25, in as much as these references collectively (i) fail to disclose or suggest a cross-linked polymer electrolyte which comprises a polymer backbone containing amine groups, and furthermore (ii) **fail to disclose or suggest such a polymer electrolyte which is inert to lithium**. Claim 1 is therefore submitted as patentable over the cited references. In as much as claims 19-22 and 25 depend from claim 1, these claims are submitted as patentable over the cited references for at least the same reasons as those noted with respect to claim 1. Although these claims include additional patentable features, these features will not be addressed at this time in the interests of brevity.

C. *Rejection of Claims 23, 24, 26 and 29 as being Unpatentable over Rosenmeier et al. in view of U.S. Patent No. 5,501,919 and U.S. Patent No. 5,648,186*

Reconsideration is respectfully requested of the rejection of claims 23, 24, 26 and 29 under 35 U.S.C. §103 as being unpatentable over Rosenmeier et al. in view of U.S. Patent No. 5,501,919 (Paul et al.), and further in view of U.S. Patent No. 5,648,186 (Daroux et al.).

Applicants' position with respect to the failures in the disclosure provided by Rosenmeier et al. and Paul et al. have been previously noted. In the interests of brevity, they will not be restated here.

Daroux et al. do not remedy the above-noted deficiencies of the disclosure of Rosenmeier et al. and Paul et al. Daroux et al. fail to disclose or suggest a covalently cross-linked polymer electrolyte having a polymer backbone containing amine groups, a cross-linker and a dissolved or dispersed metal salt, wherein the cross-linked polymer electrolyte is **inert to lithium**. In fact, Daroux et al. arguably **teach away** from such a cross-linked polymer electrolyte because (i) the only specific details they provide with respect to cross-linking involve the use of hexamethylene diisocyanate (see, e.g., column 7, lines 16-20, as well as Examples 2, 4, 12 and 13), and (ii) cross-linking using diisocyanates is known to result in the formation of urethane linkages or functionalities, which are **not** inert to lithium.⁹

Accordingly, taken together, Applicants respectfully submit the combination of Rosenmeier et al., Paul et al. and Daroux et al. fails to disclose or suggest all of the claim elements of claim 1, and thus of claims 23, 24, 26 and 29, in as much as these references collectively fail to disclose or suggest a cross-linked polymer electrolyte which comprises a polymer backbone containing amine groups and which is **inert to lithium**. Rather, taken together, this combination of references actually **teaches away** from the claimed polymer electrolyte because, at most, this combination teaches a cross-linked polymer electrolyte which comprises amines in the polymer backbone and which is **not** inert to lithium.

Claim 1 is therefore submitted as patentable over the cited references. In as much as claims 23, 24, 26 and 29 depend from claim 1, these claims are submitted as patentable over the cited combination of references for at least the same reasons as those noted with respect to claim 1. Although these claims include additional

⁹ *Id.*

patentable features, these features will not be addressed at this time in the interests of brevity.

D. Rejection of Claims 23, 26, 28 and 29 as being Unpatentable over Rosenmeier et al. in view of U.S. Patent No. 5,501,919 and U.S. Patent No. 6,096,453

Reconsideration is respectfully requested of the rejection of claims 23, 26, 28 and 29 under 35 U.S.C. §103 as being unpatentable over Rosenmeier et al. in view of U.S. Patent No. 5,501,919 (Paul et al.) and U.S. Patent No. 5,648,186 (Daroux et al.), and further in view of U.S. Patent No. 6,096,453 (Grunwald et al.).¹⁰

Applicants' position with respect to the failures in the disclosure provided by Rosenmeier et al., Paul et al. and Daroux et al. have been previously noted. In the interests of brevity, they will not be restated here.

Grunwald et al. do not remedy the above-noted deficiencies of the disclosure of Rosenmeier et al., Paul et al. and Daroux et al. Grunwald et al. **fail to disclose or suggest** a covalently cross-linked polymer electrolyte which comprises amine groups in the polymer backbone and which is **inert to lithium**. Grunwald et al. do generally reference numerous polymers, copolymers, etc., some of which would include amines in the polymer backbone (see, e.g., column 4, lines 40 to column 5, line 58), and they also reference cross-linked polymers, which could include polymers having amines in the polymer backbone (see, e.g., column 10, lines 49-60). However, few details are provided with respect to the cross-linkers that may be used. Furthermore, there is **no reference** to cross-linkers that could be employed with a polymer having amine groups in the backbone, in order to yield a cross-linked polymer which is **inert to lithium**.

¹⁰ It is noted that, although Daroux et al. is not referenced in the first full paragraph of page 17 of the present Office action, Daroux et al. is repeatedly referenced in the text of this portion of the rejection (see paragraph 6 and 7 on page 17, as well as paragraph 1 on page 18). Accordingly, it is being addressed here, as well.

Accordingly, taken together, Applicants respectfully submit the combination of Rosenmeier et al., Paul et al., and Grunwald et al. fails to disclose or suggest all of the claim elements of claim 1, in as much as these references **collectively fail to disclose or suggest** a cross-linked polymer electrolyte which comprises a polymer backbone containing amine groups and which is **inert to lithium**. Furthermore, the addition of Daroux et al., for the reasons stated above, result in a combination of references that actually **teaches away** from the claimed polymer electrolyte because, at most, this combination teaches a cross-linked polymer electrolyte which comprises amines in the polymer backbone and which is **not** inert to lithium.

Claim 1 is therefore submitted as patentable over the cited references. In as much as claims 23, 26, 28 and 29 depend from claim 1, these claims are submitted as patentable over the cited combination of references for at least the same reasons as those noted with respect to claim 1. Although these claims include additional patentable features, these features will not be addressed at this time in the interests of brevity.

E. Rejection of Claims 23, 26, 28 and 29 as being Unpatentable over Rosenmeier et al. in view of U.S. Patent No. 5,501,919 and U.S. Patent No. 5,964,903

Reconsideration is respectfully requested of the rejection of claims 23, 24, 26, 28 and 29 under 35 U.S.C. §103 as being unpatentable over Rosenmeier et al. in view of U.S. Patent No. 5,501,919 (Paul et al.), and further in view of U.S. Patent No. 5,964,903 (Gao et al.).

Applicants' position with respect to the failures in the disclosure provided by Rosenmeier et al. and Paul et al. have been previously noted. In the interests of brevity, they will not be restated here.

Gao et al. do not remedy the above-noted deficiencies of the disclosure of Rosenmeier et al. and Paul et al. Gao et al. fail to disclose or suggest a polymer

electrolyte that is covalently **cross-linked**. In fact, Gao et al. **fail to even reference cross-linking**. Accordingly, they also fail to disclose or suggest a covalently cross-linked electrolyte which is **inert to lithium**. Rather, Gao et al. simply disclose plasticizers which are suitable for use in fabricating electrochemical cells (see, e.g., column 1, line 65 to column 2, line 4).

Accordingly, taken together, the combination of Rosenmeier et al., Paul et al. and Gao et al. fails to disclose or suggest all of the claim elements of claim 1, and thus of claims 23, 26, 28 and 29, in as much as these references collectively (i) fail to disclose or suggest a cross-linked polymer electrolyte which comprises a polymer backbone containing amine groups, and furthermore (ii) **fail to disclose or suggest such a polymer electrolyte which is inert to lithium**. Claim 1 is therefore submitted as patentable over the cited combination of references. In as much as claims 23, 26, 28 and 29 depend from claim 1, these claims are submitted as patentable over the cited combination of references for at least the same reasons as those noted with respect to claim 1. Although these claims include additional patentable features, these features will not be addressed at this time in the interests of brevity.

*F. Rejection of Claims 33, 35 and 36 as being Unpatentable
over Rosenmeier et al. in view of U.S. Patent No. 5,964,903*

Reconsideration is respectfully requested of the rejection of claims 33, 35 and 36 under 35 U.S.C. §103 as being unpatentable over Rosenmeier et al. in view of U.S. Patent No. 5,964,903 (Gao et al.).

Applicants' position with respect to the failures in the disclosure provided by Rosenmeier et al. and Gao et al. have been previously noted above. Briefly, Applicants respectfully Rosenmeier et al. **fail to disclose or suggest** a covalently cross-linked polymer electrolyte having a polymer backbone containing amine groups, a cross-linker, and a dissolved or dispersed metal salt, wherein the cross-linked polymer electrolyte is **inert to lithium**. Applicants further submit that Gao et al. not only **fail to disclose or**

suggest a polymer electrolyte that is covalently **cross-linked**, they do not even reference cross-linking. As such, they **also fail to disclose or suggest** such a cross-linked polymer electrolyte that is **inert to lithium**.

Accordingly, taken together, the combination of Rosenmeier et al. and Gao et al. fails to disclose or suggest all of the claim elements of claim 1, in as much as these references collectively fail to disclose or suggest a cross-linked polymer electrolyte which comprises a polymer backbone containing amine groups and which is **inert to lithium**. Claim 1 is therefore submitted as patentable over the cited references. In as much as claims 33, 35 and 36 depend from claim 1, these claims are submitted as patentable over the cited combination of references for at least the same reasons as those noted with respect to claim 1. Although these claims include additional patentable features, these features will not be addressed at this time in the interests of brevity.

G. Rejection of Claims 37 and 38 as being Unpatentable over Rosenmeier et al. in view of Harris et al.

Reconsideration is respectfully requested of the rejection of claims 37 and 38 under 35 U.S.C. §103 as being unpatentable over Rosenmeier et al. in view of Harris et al.

Applicants' position with respect to the failures in the disclosure provided by Rosenmeier et al. have been previously noted. In the interests of brevity, they will not be restated here.

Harris et al. fail to disclose or suggest a polymer electrolyte that is covalently **cross-linked**. In fact, **they fail to even reference cross-linking**. Accordingly, they also fail to disclose or suggest a covalently cross-linked polymer electrolyte which comprises amine groups in the polymer backbone and which is **inert to lithium**.

Rather, Harris et al. disclose only branched and linear polyethylenimine. As previously noted, **branching is not the same as cross-linking.**

Accordingly, taken together, Rosenmeier et al. and Harris et al. fail to disclose or suggest all of the claim elements of claim 1, and thus of claims 37 and 38, in as much as these references collectively (i) fail to disclose or suggest a cross-linked polymer electrolyte which comprises a polymer backbone containing amine groups, and furthermore (ii) **fail to disclose or suggest such a polymer electrolyte which is inert to lithium.** Claim 1 is therefore submitted as patentable over the cited references. In as much as claims 37 and 38 depend from claim 1, these claims are submitted as patentable over the cited combination of references for at least the same reasons as those noted with respect to claim 1. Although these claims include additional patentable features, these features will not be addressed at this time in the interests of brevity.

*H. Rejection of Claim 39 as being Unpatentable over
Rosenmeier et al. in view of U.S. Patent No. 5,648,186
and U.S. Patent No. 4,578,326*

Reconsideration is respectfully requested of the rejection of claim 39 under 35 U.S.C. §103 as being unpatentable over Rosenmeier et al. in view of U.S. Patent No. 5,648,186 (Daroux et al.) and U.S. Patent No. 4,578,326 (Armand et al.).

Applicants' position with respect to the failures in the disclosure provided by Rosenmeier et al. and Daroux et al. have been previously noted. In the interests of brevity, they will not be restated here.

Armand et al. do not remedy the above-noted deficiencies of the disclosure of Rosenmeier et al. and Daroux et al. Armand et al. **fail to disclose or suggest a polymer electrolyte that is cross-linked.** In fact, they **fail to even reference cross-linking.** Furthermore, they **fail to disclose or suggest a polymer electrolyte comprising amine groups** in the polymer backbone. They therefore also **fail to**

disclose or suggest a covalently cross-linked polymer electrolyte which comprises amine groups in the polymer backbone and which is **inert to lithium**. Rather, Armand et al. disclose polymers derived from ethylene oxide (see, e.g., column 1, lines 28-31).

Accordingly, taken together, Applicants respectfully submit the combination of Rosenmeier et al., Daroux et al. and Armand et al. fails to disclose or suggest all of the claim elements of claim 1, and thus of claim 39, in as much as these references collectively fail to disclose or suggest a cross-linked polymer electrolyte which comprises a polymer backbone containing amine groups and which is **inert to lithium**. Rather, taken together, this combination of references actually **teaches away** from the claimed polymer electrolyte because, at most, this combination teaches a cross-linked polymer electrolyte which comprises amines in the polymer backbone and which is **not** inert to lithium, due to the teachings of Daroux et al.

Claim 1 is therefore submitted as patentable over the cited references. In as much as claim 39 depends from claim 1, this claim is submitted as patentable over the cited combination of references for at least the same reasons as those noted with respect to claim 1. Although this claim includes additional patentable features, they will not be addressed at this time in the interests of brevity.

*I. Rejection of Claims 74-77 as being Unpatentable over
Rosenmeier et al. in view of U.S. Patent No. 3,885,069*

Reconsideration is respectfully requested of the rejection of claims 74-77 under 35 U.S.C. §103 as being unpatentable over Rosenmeier et al. in view of U.S. Patent No. 3,885,069 (Roberts et al.)

Applicants' position with respect to the failures in the disclosure provided by Rosenmeier et al. have been previously noted. In the interests of brevity, they will not be restated here.

Roberts et al., like Rosenmeier et al., fail to disclose or suggest a covalently cross-linked polymer electrolyte which comprises amine groups in the polymer backbone and which is **inert to lithium**. Roberts et al. does disclose the preparation of cross-linked polyethylenimine using 1,2-dichloroethane (see, e.g., column 1, line 61 to column 2, line 23, and Examples 2 and 3). However, this reference is **unrelated to the preparation of a polymer electrolyte**. Rather, it is directed to the use of the disclosed cross-linked polymer in the preparation of cotton derivatives for ecological applications (see, e.g., column 1, lines 11 to 23 and Examples 6-9). As such, Roberts et al. provide no details with respect to treatment of the cross-linked polymer, so as to render it inert to lithium. (See page 18, line 27 to page 19, line 23 of the present application, as well as pages 35-36 of Applicants Letter to the Patent Office dated March 3, 2005.) In fact, Roberts et al. do not even reference lithium or the need to be inert thereto.

Given that the disclosure of Roberts et al. is unrelated to polymer electrolytes, motivation to combine this reference with Rosenmeier et al. is clearly lacking. However, even if combined, the combination of Rosenmeier et al. and Roberts et al. fails to disclose or suggest all of the claim elements of claim 1, in as much as **these references collectively fail to disclose or suggest** a cross-linked polymer electrolyte which comprises a polymer backbone containing amine groups and which is **inert to lithium**.

Claims 1 and 57 are therefore submitted as patentable over the cited references. In as much as claims 74 and 75 depends from claim 1, and claims 76 and 77 depend from claim 57, these claims are submitted as patentable over the cited combination of references for at least the same reasons as those noted with respect to claim 1 and 57, respectively. Although these claims include additional patentable features, they will not be addressed at this time in the interests of brevity.

V. Allowable Subject Matter

Applicants again respectfully acknowledge the Office's finding that claims 40-48 would be allowable if rewritten or amended to overcome the rejections under 35 U.S.C. §112, second paragraph.

Applicants also again respectfully acknowledge the Office's finding that claims 12-18 would be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims.

VI. Status of Claims 27 and 31

Applicants respectfully note that claims 27 and 31 do not appear to have been referenced in the present Office action. It is therefore unclear to Applicants whether these claims have also been found allowable or stand rejected (and, if rejected, the basis for the rejection).

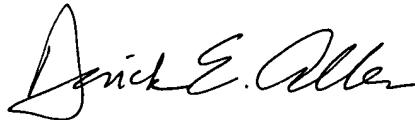
Should these claims stand rejected, Applicants respectfully they are patentable over the cited art for at least those reasons set forth above with respect to claim 1, from which these claims directly or indirectly depend. Although these claims include additional patentable features, they will not be addressed at this time in the interests of brevity.

CONCLUSION

In view of the foregoing, favorable reconsideration and allowance of all pending claims are respectfully requested.

A check in the amount of \$620.00 is enclosed (in payment of a two-month extension of time fee for the filing of this Amendment B, as well as a Request for Continued Examination being submitted simultaneously herewith). The Commissioner is, however, hereby authorized to charge any underpayment or credit any overpayment to Deposit Account No. 19-1345.

Respectfully submitted,



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